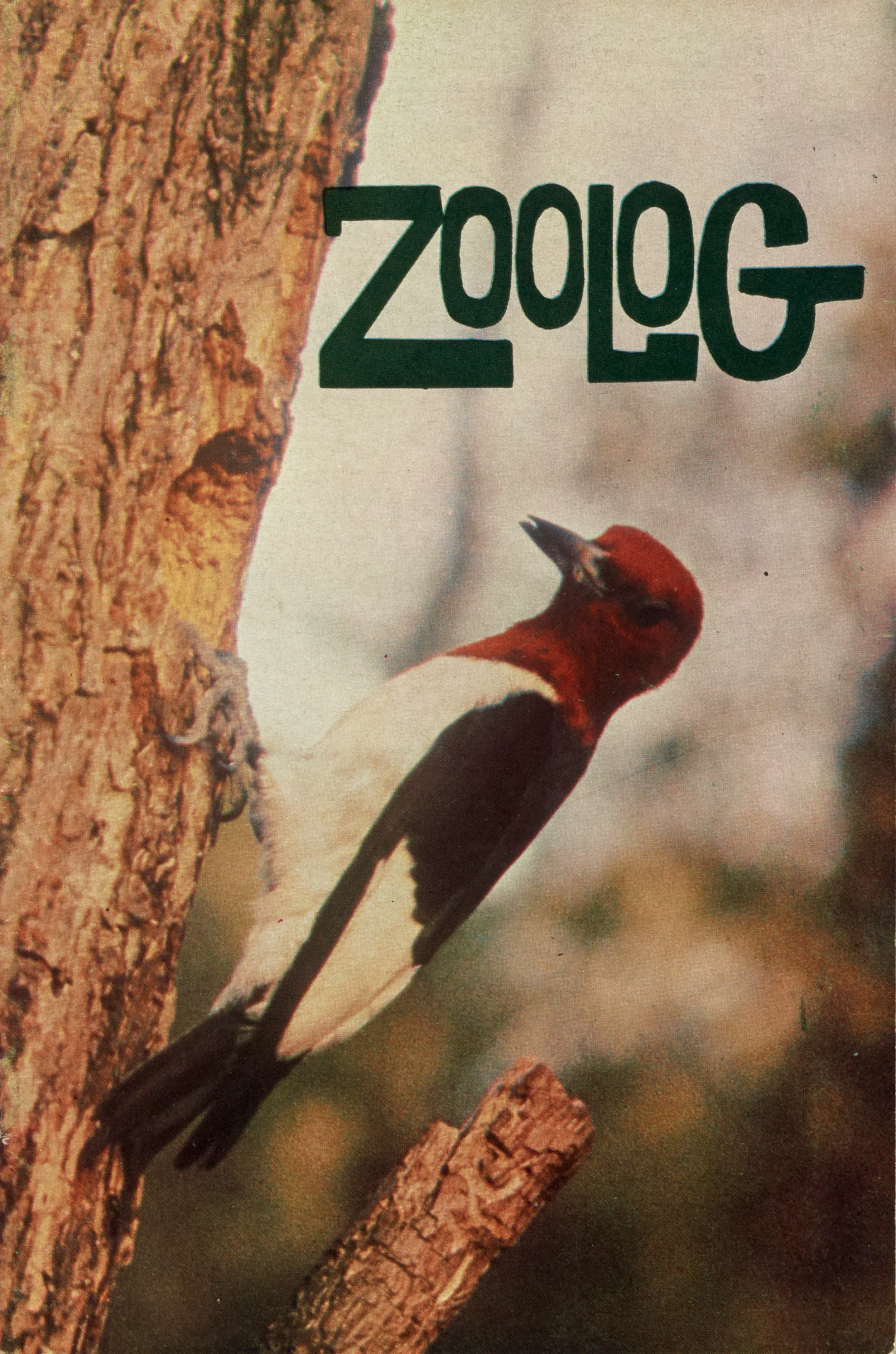
ZOOLOG



Our cover shows a Red-headed Woodpecker, photographed by R.R. Taylor in June, 1959.

Zoolog, Volume 12, Issue 4, Winter 1971
Publication of the Zoological Society of Manitoba and the Manitoba Naturalists Society
Editor — Dieter H. Schwanke
Associate Editor — Peter Press

Free to members of the Zoological Society of Manitoba and members of the Manitoba Naturalists Society
Mailed subscriptions $2.00 per year. Single copy 60¢.
Reprints of Articles on request — send all inquiries to:
Zoolog, Clandeboye, Manitoba.

Membership in Zoological Society of Manitoba — $5.00
Contributing membership — $25.00

On the trail of the Chipewyan

RONALD J. NASH
Manitoba Museum of Man & Nature

Since 1965 the author, supported by the Manitoba Museum of Man and Nature, has been doing archaeological research in the open transitional forest of northern Manitoba and southern Keewatin, N.W.T. This roughly triangular area, with Churchill at its southeast corner, was deglaciated comparatively late in time (about 6000 years ago) and evidence of the glacial action is obvious everywhere – in the drainage pattern, in the presence of the long esker ridges and in the hills of jumbled boulders. The flora and fauna of this area are, as might be expected of a transitional zone, intermediate between that of the boreal forest to the south and the barren lands to the north, yet the product of this mixture was not a land of abundance for the native peoples.

At the beginning of the eighteenth century when the English ventured from their forts on Hudson Bay in order to extend the mixed benefits of civilization to the natives of the interior, they encountered the Northern or Chipewyan Indians. These Indians possessed a stone age technology and a generalized subsistence strategy which was, however, most closely tied to the Barren Ground Caribou. The people in fact called themselves the Edthen-eldeli, or caribou-eaters. They were organized into small bands and were at home in the transitional forest, but often followed the great caribou herds out onto the barren lands during the summer.

The archaeological work was a general investigation of the region's prehistoric inhabitants, but focused on the Chipewyan in particular. Our procedure was to reach various lakes in the area by float plane and then to survey these lakes by foot or canoe looking in likely places for the stone artifacts indicative of ancient campsites. Since prehistoric peoples did not camp just anywhere, but rather with reference to good fishing spots, caribou crossings, transportation routes and many other seasonal or functional factors, their campsites are not hard to find once the basic settlement patterns are understood.

The 1971 field season was the final year of the research project, but perhaps the most significant from a naturalist's point of view. The month

Archaeological Excavations at Little Duck Lake, 1971.

of July was spent at Misty Lake and accompanying the author and field assistant Damon Chevrier was Richard Sutton of the Museum who acted as ornithologist, botanist and master angler. During August, the author and Damon Chevrier continued work at Little Duck Lake and Caribou Lake. In the course of the summer, we observed a great deal of wildlife including seals (presumably of the freshwater variety) at Caribou Lake, but were disappointed not to see the caribou herd which usually migrates past Little Duck Lake. In the not too distant past, such a shift in the herd's migration route would have meant hardship for the native people.

What sorts of artifacts did the Chipewyan use in prehistoric times and why? How long have the Chipewyan been in Manitoba and what kinds of changes did their culture undergo through time? These are the kinds of questions the research was designed to answer and one of the methods employed with some success was the Direct Historical Approach. This simply means going from the known to the unknown or history back to prehistory and requires the archaeologist to visit locations known to have been Chipewyan camping places in recent or historic times – in the

expectation that any prehistoric artifacts (especially the later ones) found there were most likely made by the Chipewyan prior to European contact. When the material culture of the prehistoric Chipewyan is known, the extent of their culture and its changes in time and space can be determined. The author collected data on recent and historic Chipewyan camps from several sources: the anthropologists Kaj Birket-Smith and more recently, James Smith (the latter having obtained considerable information from the Brochet Chipewyan); from the descriptions of explorers like Samuel Hearne and P.G. Downes and from various other individuals who have traveled the country in the last 50 years.

We have now located and made collections from about 230 sites showing prehistoric occupation and have done some excavating at the best of these sites. The analysis of these materials is not complete, but advanced enough to point towards some conclusions. The same kind of tools — projectile points, scrapers, knives (but no pottery) occur at most of these sites, but they differ in details which are important to the archaeologist. The distribution and styles of the larger spear points indicate that people whose subsistence depend partly upon caribou entered Northern Manitoba shortly after the retreat of glacial ice. Succeeding this early or Paleo-Indian culture and continuing up to about 500 A.D. are a variety of technologically undistinguished cultures reflecting little increase in cultural complexity and a low population density. After 500 A.D., however, prehistoric sites seem to be more numerous and we encounter a culture which can reasonably be linked with the Chipewyan. This culture is more parochial and superficially more heterogeneous on the basis of its stone tools, yet indicates no marked cultural evolution.

Given this thumbnail prehistory we can easily ask why there was so little change and evolution on the part of the Chipewyan and their predecessors. Since cultural evolution in pre-industrial societies is closely tied to ecological and economic processes, perhaps we can see our prehistoric societies as having made the best possible adaptation to nature and its resources such that under fairly constant external conditions, cultural changes would not be profitable. This is one possible solution, but if we consider the Chipewyan economy as Samuel Hearne wrote about it, doubts arise. Hearne gives at least tacit approval to the Chipewyan methods of hunting caribou, but he speaks disparagingly about their fishing techniques. The economy Hearne observed probably represented a basic adaptation similar to that employed by most prehistoric peoples of the region. Hindsight is a marvelous thing, but we can wonder what might have been if the Chipewyan had paid less attention to caribou and more to improving and expanding their fishing operations. Was an easier and more sedentary life not possible?

European domination brought many sudden changes to the Chipewyan, but even as late as 1956, the Little Duck Lake band remained faithful to an older way of life. In that year, however, the band was moved to Churchill — a move with many unhappy consequences for the people. The Chipewyan story is a continuing one, however, for recently a few of the people have returned to a life in the "land of little sticks" where they will need more adaptibility than was ever required of their ancestors.

Range maps of birds

H.W.R. COPLAND
Manitoba Museum of Man & Nature

Nearly everyone is aware of birdlife in Manitoba, though this awareness may only be the sound of Canada Geese honking as they fly overhead, the loud song of a Robin outside a bedroom window in the early hours of a May morning, or the daily presence of House Sparrows throughout the year. Without any doubt, the House Sparrow lives more closely in association with people than any other species of wild bird in Manitoba. If its numbers decline significantly, as during the winter period in Manitoba, great concern is expressed by people who daily provide food at bird feeders or simply scatter pieces of bread or seeds outside their doorstep. Perhaps, because of its persistence and tenacity to survive under severe winter conditions, we subconsciously see the House Sparrow as exemplifying our own determination to accept living in a rather harsh climate.

It is from such initial interest in the birds we see frequently that a desire to be able to recognize and identify more of the birds we encounter is aroused. Travelling through the country by car, canoe or boat, or while spending weekends and holidays at summer cottages, many opportunities are presented to test our powers of observation. As experience is gained in identification, it also becomes apparent that certain birds are to be found most frequently in specific types of habitat. By plotting on a map the locations where we note certain species, we begin to build a graphic picture of their range.

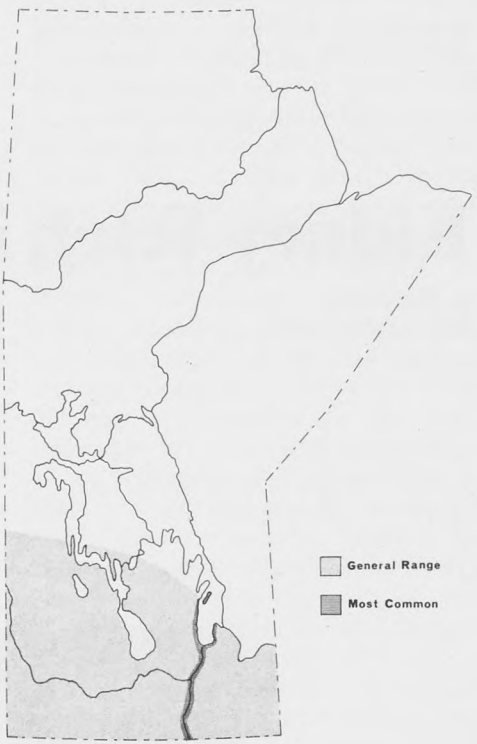
In establishing the range of a bird, we must supplement our own notes and field work with material from other sources. Information may be obtained from published records and notes, and also current information received from competent field observers. The person carrying on a study may have opportunities to visit some areas and verify the occurrence of a species, but this is not always possible.

One result of undertaking a range map project, for example, on a bird such as the Red-headed Woodpecker, is that a greater awareness is stimulated toward all species of woodpecker. Six of eight species of woodpecker regularly occurring in Manitoba,

(Yellow-shafted Flicker, Yellow-bellied Sapsucker, Red-headed Woodpecker, Downy Woodpecker, Hairy Woodpecker, Pileated Woodpecker), show either large or small patches of red about the head. Two of these six species also show red on the throat, so care must be exercised when accepting reports of sightings. However, no serious problem in identification should be present since only the Red-headed has a completely carmine red head and throat, and both sexes of this bird are alike. Young Red-headed Woodpeckers differ from adults mainly by being a dark brownish gray about the head and throat and show little or no red.

The accompanying range map shows the main lakes and river systems of the province with an additional lake or river to help define the limits of the range. Place names can be shown but are not always necessary. This would depend on the purpose for which the map is to be used. Shaded areas illustrate where a species is most or least abundant. The position where adjoining areas meet cannot be considered a positive demarcation line but only a judgement based on records available. In this respect, the Red-headed Woodpecker is shown to be more frequently found in narrow areas bordering the Red River from the United States northward to the east and west sides of Lake Winnipeg.

The large parks of Greater Winnipeg are in this area and it is remarkable to find Red-headed Woodpeckers present in spite of being drenched almost daily with insecticides. Perhaps it was only fine stage productions at Kildonan Park that enticed one pair to select a nest site in a tree on the perimeter of Rainbow Stage. Some theatre critic, however, might be more inclined to state that, indeed, some productions were only "for the birds".



H. W. R. Copland

It may take a few years to gather sufficient information to produce a range map. New information can be incorporated from time to time which may result in the boundaries retracting, remaining unchanged or being extended. Sources of information which may be helpful are local nature columns and regional publications containing annotated bird lists. The ranges of some species of birds in Manitoba at present remain poorly defined.

Kidney Vetch in Manitoba

D. PUNTER
R.E. LONGTON

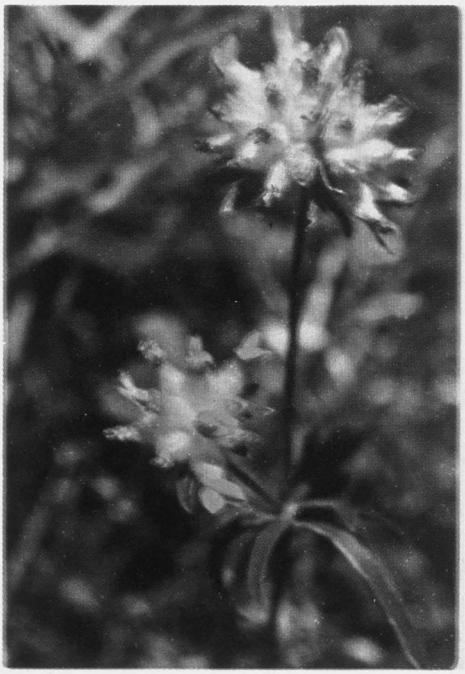


Photo by David Punter, 1971

Kidney Vetch

Among specimens recently submitted to the Department of Botany, University of Manitoba for identification was one of *Anthyllis vulneraria* L., commonly known as Kidney Vetch or Ladies' Fingers. *A. vulneraria* is a native of Europe east to the Caucasus and North Africa, where it is sometimes used as a forage plant. It has occurred widely as an alien in North America, probably introduced deliberately for ornamental purposes or accidentally with seed of other forage plants. There are reports of *A. vulneraria* from Ontario, Quebec, the New England States, Pennsylvania, Ohio, Michigan, Missouri, Iowa and N. Dakota but as far as we can discover, this is the first authenticated record from Manitoba.

The original material was sent by Mrs. R. Howard who had collected it during June 1971 from the verge of Highway 324, north-west of Camp Morton near Gimli. Mrs. Howard informs us that this species was abundant in a nearby location in 1969. Although she does not mention seeing it in 1970, *A. vulneraria* has undoubtedly been established for three seasons and appears to be becoming naturalized in the area.

On 30 July 1971 we located a population of at least 15 plants of *A. vulneraria* on the eastern side of Highway 324 approximately 5 miles N.W. of Camp Morton. These plants were growing near the bottom of a steep bank which rose from the roadside ditch to a field beyond. The ditch, which was cut through gravelly till, would normally be dry during the summer months. *A. vulneraria* formed part of an open community in which the grasses *Agrostis stolonifera* var. *major* (Redtop), *Agropyron trachycaulum, A. trachycaulum* var. *unilaterale,* and *Muhlenbergia glomerata* var. *cinnoides* predominated. Other associated species included *Achillea millefolium* (Common Yarrow), *Comandra richardsiana* (Bastard-Toadflax), *Equisetum arvense* (Field Horsetail), *Fragaria virginiana* (Strawberry), *Galium septentrionale* (Northern Bedstraw), *Melilotus alba* (White Melilot), *Sisyrinchium montanum* (Blue - eyed Grass), and occasional seedlings of *Picea glauca* (White Spruce) and *Populus tremuloides* (Aspen). This habitat conforms rather closely with our experience of *A. vulneraria* in Europe, where it is commonly found in open communities on dry slopes and base-rich soils. Occasional plants of *A. vulneraria* also occurred in the ditch-bottom community comprising short grasses, *Juncus balticus* var. *littoralis, Lobelia kalmii,* and *Parnassia multiseta* (Grass-of Parnassus), interspersed with areas of bare ground.

Scoggan reports the presence of 193 introduced species of vascular plants in Manitoba, equivalent to about 13 percent of the total flora. Many of these aliens grow principally in disturbed, man-made habitats, a feature usually ascrived to their inability to compete successfully with native species in natural vegetation. It remains to be seen if *A. vulneraria* will succeed in becoming established as a permanent member of our flora.

Our thanks are due to Mrs. Howard for drawing our attention to the Camp Morton population of *A. vulneraria.* Specimens have been deposited in the herbaria of the Department of Botany, University of Manitoba and the National Museum of Canada, Ottawa.

The Relief of Manitoba

GUY KENDRICK
Manitoba Museum of Man & Nature

As most Manitobans live on the flat featureless southern portion of Manitoba, the belief exists that the province is a swampy lowland devoid of relief. A relief map does show that two-thirds of the province is a lowland with an elevation less than 1000 feet above sea-level. But in the southwest, abrupt changes in elevation occur, with the highest point in Manitoba occuring at Baldy Mountain with an elevation of 2727 feet. Manitoba has many relief features of interest.

It is convenient at this point to divide Manitoba into 4 major physiographic regions. The Precambrian Shield forms the largest region, the "backbone" of Manitoba, and is underlain by ancient crystalline rocks. The shield presents an even monotonous landscape to the viewer from the air. Enveloping the shield to the northeast and southwest are low borderlands underlain by shallow dipping Palaeozoic and Mesozoic sediments. The Hudson Bay Lowlands flank the shield to the north and are underlain by shallow dipping Palaeozoic limestones and dolomites. The Manitoba Lowland south and west of the shield, underlain by Palaeozoic strata, contain large lakes, extensive bogs and the most dense concentration of human habitation of any region in the province. The fourth region consists of the Western Upland and is varied in relief. Elevations of the "mountains" are greater than 2000 feet. Provincial forests and parks are located in areas of contrasting relief and are within reach of the city of Winnipeg by automobile.

The relief of Manitoba cannot be studied without taking into consideration the dominating effect of glaciation. Ice eroded, transported and deposited material. At the last maximum stage of glaciation, a major continental ice sheet had advanced southward into the United States as far as the Missouri River. Extensive deposits of till were deposited by the ice mainly in lowland areas. As the ice sheet melted and retreated northward, glacial Lake Agassiz was ponded in front of it, and covered over half of the province at one time or another. The ice sheet retreated northward in a series of stages, often remaining stationary in one position for a lengthy

time, and deposited extensive ill-sorted material to form a ridge-like feature called a terminal moraine. Terminal moraines form hummocky ridges at the top of the Manitoba Escarpment and in the southeast section of the Manitoba Lowland. Like the ice sheet, Lake Agassiz, too, slowly disappeared. As the lake was drained, a series of long linear beach ridges formed at different elevations. Beach ridges extend for many miles and can be seen today following the Manitoba Escarpment. Deposits of lacustrine sands, clays and silts deposited on the floor of Lake Agassiz cover tracts of the Manitoba Lowland. Lacustrine deposits consist of material transported into a lake environment by rivers, but sometimes glacial debris may be carried into the lake. In Winnipeg such clays exceed 60 feet in thickness. During the existence of Lake Agassiz, the sea inundated the Hudson Bay Lowland and marginal portions of the shield. In recent times, the land has "rebounded" after the disappearance of the ice sheet, and the sea has retreated to reveal land.

The Hudson Bay Lowland is the lowest part of Manitoba and is less than 500 feet above sea-level. It consists of a vast flat swampland with numerous bogs, muskegs, and shallow points. The region is underlain by flat-lying Palaeozoic Limestones and dolomites, covered by till and an extensively developed marine clay. The most conspicuous relief features are numerous raised beaches forming ridges which parallel the shore of Hudson Bay and are found many miles inland. The larger rivers flow in trenches which may be 50-100 feet deep.

The landscape of the Canadian Shield viewed from the air consists of myriads of lakes, bogs, muskeg, rivers, creeks, rock outcrops, ridges and forest. The horizon is evidence of an old, almost all-subduing, erosion surface — a peneplain — and is the most outstanding characteristic of the Precambrian Shield. The Precambrian Shield consists of ancient rocks that are the result of many periods of orogeny and erosion. Mountain ranges were thrust up and worn down several times to form a peneplained surface. This surface was probably similar to the one we see today before the deposition of Palaeozoic rocks on the Precambrian. Today near the southern rim of the Canadian Shield, outliers of Palaeozoic limestone outcrop. In places, the limestones are seen to mask a Precambrian erosion surface consisting of low ridges and valleys similar to the peneplain seen today. It is conceivable that the shield is an exhumed erosion surface little modified by glaciation except for the scouring action of the ice. Material was deposited as the ice retreated.

Glaciation has profoundly affected drainage in the shield; no pre-glacial drainage system can be deciphered. The larger rivers, such as the Churchill and Nelson rivers, flow northeast to Hudson Bay following the regional slope. In detail, the drainage system is apparently undeveloped. Where the scouring action of the ice is severe and much bedrock is exposed, the drainage develops a trellis-like pattern which is structure controlled. Rivers and streams follow fracture zones, major joint patterns, long straight lineaments and "soft" strata. In certain areas, the strata are folded and river courses exhibit complicated fold patterns with sinuous twists. In many areas, glacial movement was transverse to the bedrock topography, and scattered deposition of glacial drift blocked former divides. A mosaic of ponds, interspersed with small ridges and hum-

mocks, was formed amongst which the stream followed tortuous courses.

The Precambrian Shield is divided into three sub-areas. The Upper Nelson Plain extends about 150 miles northward from Lake Winnipeg and consists of a plain of subdued relief covered extensively by lacustrine clays and silts. West of Thompson, beaches in Lake Agassiz have given rise to elevated sand and gravel deposits at Partridge Crop Hill and on the Thompson-Lynn Lake right-of-way. A transitional zone surrounds the Upper Nelson Plain and extends southward along the east shore of Lake Winnipeg forming a plain of undulating to rolling relief with clay deposits restricted to stream courses. The Precambrian Drift Plain covers most of the shield and varies greatly in relief throughout its extent, being subdued in the central section, but rising in elevation to the southeast and northwest where a maximum relief of 500 feet is attained. South of Nueltin Lake, a spectacular series of esker ridges run in a northeasterly direction for many miles and often rise a few 100 feet above the valley floors. Eskers usually form long, narrow serpentine ridges composed of crudely stratified sand, gravel and cobbles. This material was probably deposited by streams that flowed within, or at the base of, a retreating ice sheet. Many of the lakes occur in rock basins and consequently have irregular shapes. Many are connected by rivers that often have waterfalls and rapids and give rise to spectacular scenery much appreciated by the tourist in such areas as the Whiteshell Provincial Park along the Churchill River.

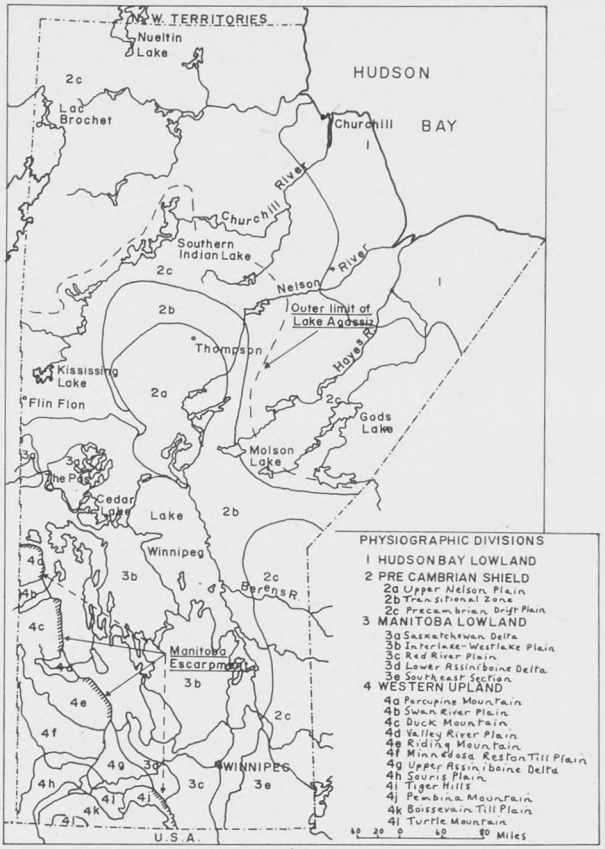
The Manitoba Lowland forms the flattest part of the province and occurs between the Precambrian Shield and the Western Upland. Most of the lowland is covered by large shallow lakes (lakes Manitoba, Winnipeg and Winnipegosis) and extensive marshes (Netley Marsh north of Selkirk). Flat, gently undulating lacustrine plains were formed in Lake Agassiz by the Red and Assiniboine rivers in the south and the Saskatchewan in the north near The Pas. The Saskatchewan delta west and east of The Pas consists of flat ill-drained ground. The Pas moraine, forming an arcuate ridge, extends into Lake Winnipeg and Long Point and probably impeded the Saskatchewan River which broke up into numerous distributaries and lakes.

The Assiniboine River, flowing off the Manitoba Escarpment into Lake Agassiz, constructed an extensive delta of silt, coarse sand, and gravel between Portage la Prairie and Brandon.

The major portion of the Manitoba Lowland consists of the Interlake-Westlake Plain. Glacial and lacustrine deposits are generally thin on the limestone bedrock. The surface is gently undulating and characterized by low northwest and southeast running ridges that are separated by hollows filled by bog. Lake Agassiz beaches mainly follow the trend of the Manitoba Escarpment forming ridges perpendicular to the stream flow. As a result, surface drainage is impeded and bogs have formed upstream from the beach ridges. A noteworthy beach extends northeast from Grand Rapids and has been used in the construction of the new highway to Ponton.

The southeast section is largely covered by outwash sands and gravels formed by streams that issued from the ice edge and is ideal for forest growth. Land above the 100 feet contour line is covered by terminal moraine, which forms fairly rough terrain with knobs, kettles and extensive marsh and bog.

The Western Upland forms the



southwestern part of Manitoba and is a region of varied relief. Elevations above 2000 feet were called mountains by the early settlers. Riding, Duck and Porcupine mountains form the steepest part of the Manitoba Escarpment and are separated by broad gentle valleys. Turtle Mountain is an erosional remnant capped by Tertiary rocks. The "mountains" are capped by terminal moraines which form a rough, hummocky topography interspersed with lakes and swales. This land has been reserved as forest and recreational areas. The lower ground in the south consists of till plains and is intermediate between the higher, rough morainic areas and the lower, flat lacustrine lowlands. Till plains, such as the Minnedosa-Reston till plain, are undulating to rolling in outline, and pockmarked by numerous undrained swales and sloughs.

Certain relief features aided the development of Manitoba. The major north-flowing rivers first aided the Indian to hunt and fish at will and secondly permitted the early settlers to travel from Hudson Bay to the heart of the continent. Modern man has or is about to use these rivers to generate hydro-electric power. This would be a demonstration of technological progress in harnessing natural power. If this is carried too far, large tracts of land in the province would be devastated. Such an abuse of natural resources would but poorly emulate those times when Manitoba was a virtually uninhabitable wilderness mainly covered by ice, melt water and the sea.

Manitoba Polar Bears

Photographs of a survey flight along the Manitoba shores of Hudson Bay in November 1971. All photos by D. H. Schwanke.

Mammoths and Mastodons

DAVID W. KRAUSE
Manitoba Museum of Man & Nature

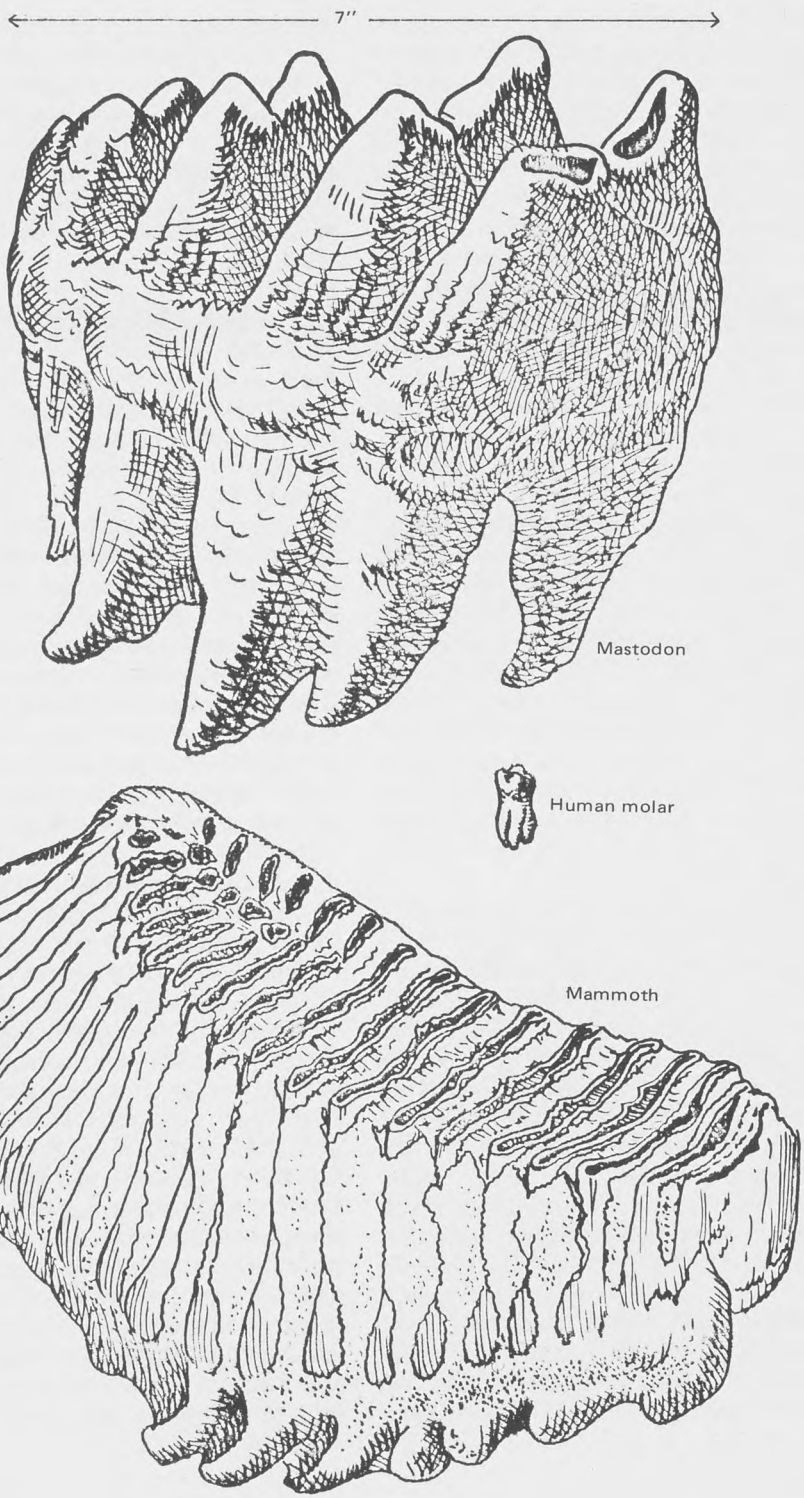
Being aware of present distribution of mammals, it is difficult to visualize mammals such as camels, llamas, zebras, huge armadillo-like creatures called glyptodonts, hyaenas and sabre-tooth cats inhabiting various regions of North America. Yet, from numerous fossil finds of these creatures, we know that they were present on this continent in the very recent past (in terms of geologic time). Stranger still is the fact that members of the mammalian family *Proboscidea* (elephants: fossil and recent) roamed across the province of Manitoba. To date there are at least ten recorded sites of fossil mammoth and mastodon remains in Manitoba. Mammoth teeth and/or bones have been recovered from Benito, Birds Hill, Dufresne, Rathwell, Rivers, Snake Creek, Springfield, and Transcona while the two mastodon sites are at Moosenose and Swan River. Mammoths and mastodons are now known to have existed on every continent except Australia at some time during the Pleistocene epoch. Early in the Pleistocene (about 1.5 million years ago) mammoths crossed Beringia (the land bridge across the Bering Straits reconnecting Siberia and Alaska several times in geologic history) and entered North America. Mastodons had crossed considerably earlier, reaching northern South America by the Late Pliocene (the epoch period to the Pleistocene beginning about 13 million years ago).

Mastodons can be differentiated from mammoths primarily through dental characteristics. Mastodon molars are low-crowned, have two to five prominent transverse ridges, are covered with a thick enamel, usually have no cement on the crown, and have well-defined roots. Each transverse ridge consists of a lateral pair of protuberances from which the mastodon derives its Greek name: *mastos* meaning breast and *odon* meaning tooth. A mammoth molar, on the other hand, is high-crowned, has a large number of vertical plates of dentine covered with enamel, is covered by a thick coat of cement, and has indistinct roots. As the tooth wears, the dentine and cement are worn down at a faster rate than the hard enamel and consequently a narrow ridge of enamel protrudes and serves as a grind-

ing mill. Mastodons had twenty-four cheek teeth during their lifetime, never retaining more than four in one half of each jaw at a time, and, in most cases, only three. Mammoths had only one molar per half jaw at any one time, however occasionally two were retained. Mammoths, as well as modern-day elephants, had a peculiar type of tooth replacement. The teeth were not supplanted in a vertical direction, as is the case in mastodons and most other mammals, but rather from the back of the jaw forward. The anterior portion of a succeeding tooth started to wear before the whole tooth was in position. The tusks of both mammoths and mastodons are modified second upper incisors, rather than canines. Mammoth tusks are usually more curved and received equal use. Mastodons, however, seem to have favored one tusk more than the other and therefore wore them unevenly. Some of the earlier mastodons had lower tusks also. These tusks tended to become reduced through evolution and the later mastodons had only vestigial lower tusks, and in some they were lacking altogether.

The lower jaw of a mastodon is relatively longer than that of a mammoth. Although the skulls of both are very similar, the mastodon's forehead is considerably lower. The mastodon was of a stockier build than the mammoth. The shoulder blade or scapula is a particularly distinctive feature between the two groups, the mastodon's being much wider. Mammoth hair seems to have been much thicker and heavier than mastodon hair. Mammoth hair samples recovered from Siberian ice are up to eighteen inches long. Along with this great protective outer covering, mammoths had a fine insulating under-hair two inches long. The trunk was also hairy and even the small ears were concealed and thus protected beneath long tufts of hair. Most scientists, however, agree that the outer hair was either black or a rusty brown and that the shade varied on different parts of the body. Mastodons could only claim a moderately heavy coat of shaggy hair with no under-hair for insulating purposes.

Although mastodons were not abundant in Manitoba, evidence of their existence has been found in at least sixty-three different sites in southern Ontario along the north shore of Lake Erie. It must not be overlooked that this could be an error in sampling, that is, that extensive farming operations in southern Ontario have been responsible for the discovery of many of these sites. Agricultural activities in Manitoba are not as intense, therefore resulting in fewer mastodon sites being located. However, this is probably not the case, since paleoecological studies have given us adequate reasons to account for their known distributions. The habitat in southern Ontario was ideal for mastodon occupancy. Mastodons are known to have lived in a cool temperate forest zone similar to the one now occupied by Moose or Woodland Caribou. During the four main glacial advances and subsequent retreats in North America, the mastodon, along with other cool-zone animals, moved north and south across the continent. The final retreat of the last major continental glacier, the Wisconsin, began approximately 35,000 years ago. Around 13,000 years ago, the first part of Manitoba was freed from ice. This was the southwestern corner of the province in the Tiger Hills area. Within another 1,000 years the Riding, Duck, and Porcupine mountains were all ice-free. Throughout this period and up


7"
Mastodon
Human molar
Mammoth

until about 7,000 years ago, the meltwater from the huge Wisconsin ice sheet was forming glacial lakes Souris and Agassiz.

The newly-exposed swampy habitat, preferred by mastodons, was therefore rapidly occupied during the late glacial and early post-glacial period. From studies of pollen samples *(palynology)* associated with mastodon remains, it has been determined that these animals preferred areas of poor drainage, in forests of which black spruce *(Picea mariana)* predominated. The spruce forests also contained balsam fir *(Abies)*, larch *(Larix)*, alder *(Alnus)*, willow *(Salix)*, and later, hemlock *(Tsuga)*. As time progressed, however, the ice margin receded even further, much better drainage resulted, and white spruce *(Picea glauca)*, and later, pine *(Pinus)* and oak *(Quercus)* migrated into the better-drained moraine and dune areas. The infiltration of these pine-hardwood forests from the south into the previously poorly-drained areas became an ecological barrier against mastodon migrations. With only isolated pockets of desirable habitat available, the mastodon may have been forced into closer competition with other browsing mammals. Herein lies a probable cause for extinction: exposed to a less suitable environment the mastodon may have reached a critical level of population, become more sensitive to disease, and may have even fallen easier prey to the Paleoindians.

Due to the superior insulating qualities of their shaggy hair, mammoths were able to adapt to cold weather much better than mastodons and therefore journey farther north. Hairy mammoth remains have been recovered from as far north as Melville Island at 75 degrees north latitude. Due to the extreme southerly advances of the Pleistocene ice sheets, mammoths have also been found in Mexico. As stated before, mammoth molars have closely crowded cross-ridges which are suitable for grinding (triturating) tough grasses. Grasses were indeed the mammoth's main diet, a fact borne out by pollen grain analyses of the stomach contents of several Siberian specimens. It is assumed that the mammoths could have lived not only on northern grasslands vegetation but also on tundra.

There are but two relatives of mammoths and mastodons still extant: the African Elephant and the Indian Elephant, both restricted to tropical climes. Mammoths survived late into the Pleistocene epoch and remains have been found in association with Clovis fluted points radiocarbon-dated at 11,200 years ago. Although it is not certain that the samples were uncontaminated, radiocarbon dates on mastodon bones are as recent as 6,000 to 8,000 years ago. It is indeed a pity that these interesting hairy elephants must be included in the list of extinct animals.

Snakes

WILLIAM B. PRESTON
Manitoba Museum of Man & Nature

Snakes are among our most misunderstood animals. They have long suffered an undeserved reputation, the roots of which lie deeply buried in ignorance. To know and understand snakes is to enjoy them for they are among our most beautiful and graceful creatures. Those who would look at a Gaboon Viper without horror but with understanding, would most certainly marvel at the beauty of its design. Those who have looked at one of the large constrictors, a boa or a python, and have noticed the rainbow iridescence that reflects from each coil and changes as the snake moves, will understand.

What is a snake? It is a vertebrate animal, like ourselves, but belonging to a different class, the reptiles. No single feature, such as feathers in birds, or hair in mammals, distinguishes reptiles as a group. In general, these animals may be recognized by their scaly skins. This and their lack of a larval stage in their development distinguishes them from the amphibians. Unlike birds and mammals, reptiles must rely on an external heat source to maintain a body temperature sufficient for activity. This ectothermy (ectothermy = heat from without) they share with all other lower vertebrates.

Among the reptiles, snakes are most closely related to the lizards, from which they appear to have evolved. Indeed, they have been referred to as "Modified lizards". A striking similarity between lizards and snakes is the presence of hemipenes, the paired copulatory organs of the male. When not in use, these organs are inverted in the base of the tail. During mating the hemipene nearest the female is everted into her cloaca (the terminal part of the gut into which the reproductive and kidney tracts open) and caries the sperm.

There is much overlap in the differences between lizards and snakes. No snake has legs, although some boas retain the vestiges of hind limbs. On the other hand, not all lizards have legs. For example, worm lizards and glass lizards are without legs. All snakes lack moveable eyelids as do some lizards, such as the night lizards *(Xantusia)* and some gekkos. No snake has external ear openings, but neither

Photo by W. B. Preston, May, 1971

A "ball" of courting Red-sided Garter Snakes

do some lizards. In all lizards the ventral scutes or scales are in several longitudinal rows across the belly. In snakes they are in a single row of transverse plates except in certain specialized families, for example, some sea snakes. Many more such examples could be cited.

In body form, snakes are long and slender and the shape and arrangement of the internal organs conforms to this. In all snakes except two families the left lung is either absent or greatly reduced in length. In *Boidae* and *Xenopeltidae* it is present but much smaller in size than the right lung. The arrangement of the kidneys and reproductive glands is staggered, those on the right being much farther forward than those on the left. The digestive tract, except the small intestine, is straight, the stomach being only slightly larger in diameter than the gullet. These are all space conserving features facilitating the narrow shape characteristic of snakes.

This long, narrow shape has enabled snakes to exploit many ways of life or niches. In addition to those terrestrial snakes that live on the surface, there

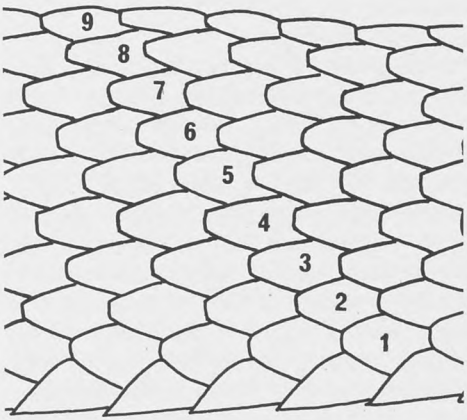
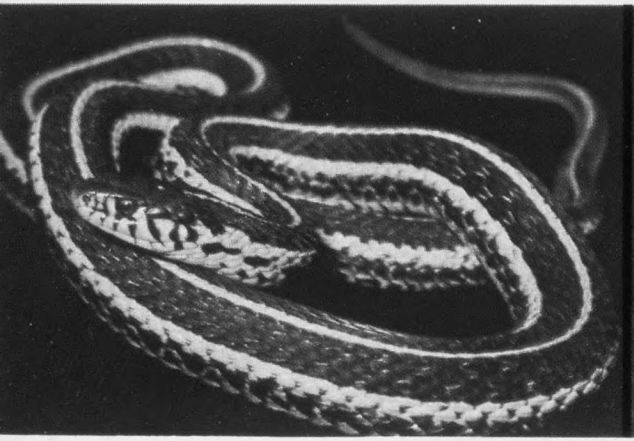
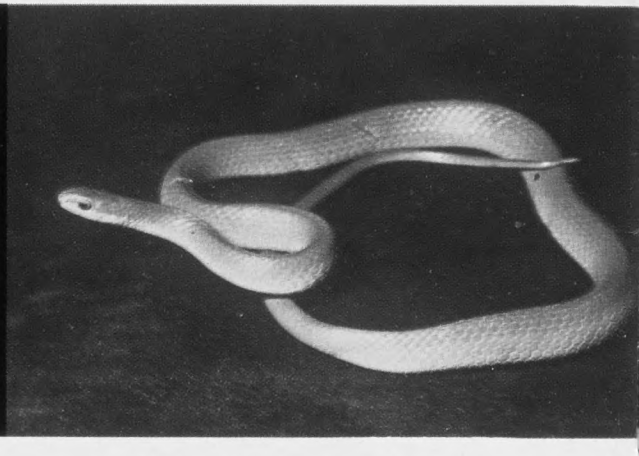


Diagram showing the method of counting scale rows in snakes. The front of the snake is to the right.



Plains Garter Snake W. B. Preston, October, 1970



Smooth Green Snake W. B. Preston, July, 1971

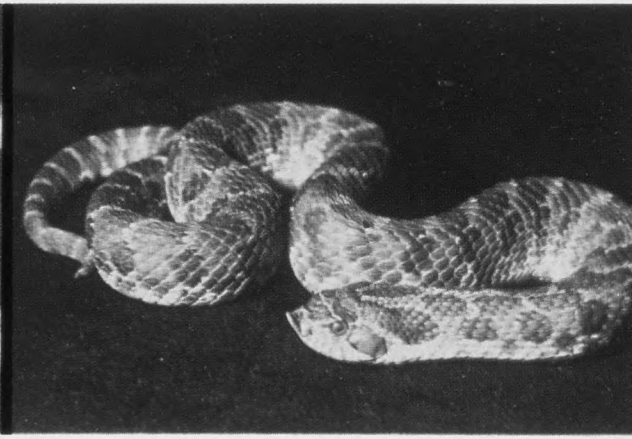
are those that are adapted to a life below the surface, the burrowers. Examples are the Rubber Boa, ranging from British Columbia to California and the blind snakes of the southwestern United States. Examples of arboreal snakes, those adapted to a life in the trees, are the Boomslang of Africa and the vine snakes of tropical America. Some are modified for an aquatic life. The sea snakes, some of which never come to shore, have flattened, paddle-like tails – an adaptation for swimming.

All snakes are predators and adaptations for obtaining food are numerous. The African egg-eating snakes eat only eggs and have modifications for cutting through the shell as the egg is swallowed. Several species have adaptations for extracting snails from their shells. Large, active prey presents other problems such as the possibility of injury to the snake. Some snakes merely seize their prey and begin swallowing. Others seize the prey and kill it by constriction; examples are the boas, bull snakes and king snakes. Yet others have developed an efficient injection mechanism for overcoming the prey by envenomation. Actually a modified saliva, the venom begins the process of digestion as well as rapidly killing the prey with little danger to the snake.

Approximately 2700 species of snakes are known to exist in the world, of which about 113 are known from North America north of Mexico, 23 from Canada and only five from Manitoba.

While we have few species, we are partially compensated for this in numbers of individuals. Some of the largest snake hibernacula known to occur in North America are located here in Manitoba. These are the wintering dens of the Red-sided Garter Snake *(Thamnophis sirtalis parietalis)*, our most common and abundant snake. Literally hundreds of individuals may be seen at one time at a hibernaculum during emergence from hibernation. At this time, "balls" or piles of snakes may be seen in the vicinity of the den. Closer examination reveals such a "ball" to consist of one female and many males, all attempting to court her, for this is mating time. They are attracted to her by odour. Many pairs

Red-bellied Snake R. R. Taylor, 1963



Western Hognose Snake W. B. Preston, July, 1971

may be observed in courtship and many single males may be scattered about prowling or basking.

In spite of the common name of this species, not all individuals have red sides. The only source of confusion in the identification of this snake in Manitoba is the Plains Garter Snake *(Thamnophis radix)*. These two can be distinguished easily by the position of the lateral stripe, that is, the stripe on each side of the body. In the Red-sided Garter Snake, counting up from but excluding the ventral scales, the stripe occupies the second and third scale rows. In the Plains Garter Snake, it is located on the third and fourth scale rows. In addition, in the latter species a row of dark blotches is located below the lateral stripe and the lip scales are lined with black.

The Red-sided Garter Snake ranges over the southern half of the province. The Plains Garter snake is restricted mainly to the grasslands and parklands of the southwestern corner of the province. Both species feed primarily upon amphibians.

Our other three species are perhaps more readily identified. The Red-bellied Snake *(Storeria occipitomaculata)* is the only one having a red venter. The Smooth Green Snake (*Opheodrys vernalis)* is characterized by its covering of smooth green scales. The Western Hognose Snake *(Heterodon nasicus)* is brownish with dark blotches arranged in three rows and has an upturned snout, from which it receives its common name. This snout is used in burrowing and in digging into the sand in search of toads which it prefers as food. The Smooth Green Snake feeds upon insects such as grasshoppers and caterpillars, and the Red-bellied Snake upon slugs, earthworms and other invertebrates. Whereas the two garter snakes and the Red-bellied Snake give birth to living young, the Smooth Green Snake and the Hognose Snake lay eggs. These last three species are mainly of southern distribution in Manitoba with the Hognose Snake restricted to sandy areas of the southwestern part of the province.

It should be pointed out that the distributions given here for Manitoba are only approximate, since our knowledge is yet incomplete.

FREE POLAR BEARS!

Fresh from the printer — a new booklet

The Great White Bears

is now available for free distribution.

International concerns for the welfare of Polar Bears, and management problems at Churchill, give this 18-page, informative booklet a unique value.

Color photos and an authoritative text give considerable information on the world-wide status of Polar Bears and the seasonal activities of Manitoba's large bear population.

This latest publication in a series on natural resources follows the successful, award-winning booklet on the wolf — **The Wild Dogs.**

These booklets and others are available without charge from: **DEVELOPMENT AND EXTENSION SERVICE, BOX 11, 139 TUXEDO BOULEVARD, WINNIPEG, R3C 0V8, OR FROM ANY CONSERVATION OFFICER.**

Department of Mines, Resources and Environmental Management
Hon. Sidney Green, Q.C., Minister, W. Winston Mair, Deputy Minister